ELSEVIER

Materials and Design 20 (1999) 351–355

Materials & Design

Index to Volume 20 (1999)

Number 1 pp. 1–62
Numbers 2/3 pp. 63–158
Number 4 pp. 159–212
Number 5 pp. 213–286
Number 6 pp. 287–356

Article Index

Number 1

A methodology for integrating materials science with system engineering
G. Subbarayan and R. Raj 1

Stability of lead alloy compressive work hardening
J.R. Riddington and M.K. Sahota 13

Structure and wear-resistance of an Fe-VC surface composite produced in situ
Y. Wang, F. Li, G. Zeng and D. Feng 19

Environmentally-sensitive design: Leonardo WAS right!
B.S. Thompson 23

Effect of triggering on the energy absorption capacity of axially compressed aluminum tubes
S. Lee, G. Hahn, M. Rhee and J.-E. Oh 31

Impact energy absorption of 6061 aluminum extruded tubes with different cross-sectional shapes
D.-K. Kim and S. Lee 41

Numbers 2/3

Special Issue: Solid Freeform Fabrication
Guest Editor: David L. Bourell

Editorial iii

Modeling and designing functionally graded material components for fabrication with local composition control
T.R. Jackson, H. Liu, N.M. Patrikalakis, E.M. Sachs and M.J. Cima 63

FDM systems and local adaptive slicing
J. Tyberg and J.H. Bøhn 77

Automated fabrication of complex molded parts using Mold Shape Deposition Manufacturing
A.G. Cooper, S. Kang, J.W. Kietzman, F.B. Prinz, J.L. Lombardi and L.E. Weiss 83

Thermal-expansion and fracture toughness properties of parts made from liquid crystal stereolithography resins
J.S. Ullett, T. Benson-Tolle, J.W. Schultz and R.P. Chartoff 91

Study of ejection forces in the AIM™ process
N. Hopkinson and P. Dickens 99

Understanding thermal behavior in the LENS process
M.L. Griffith, M.E. Schlienger, L.D. Harwell, M.S. Oliver, M.D. Baldwin, M.T. Ensz, M. Essien, J. Brooks, C.V. Robino, J.E. Smugeresky, W.H. Hofmeister, M.J. Wert and D.V. Nelson 107

Processing of titanium net shapes by SLS/HIP
S. Das, M. Wohlert, J.J. Beaman and D.L. Bourell 115

Materials for biomedical applications
N.K. Vail, L.D. Swain, W.C. Fox, T.B. Aufdlemorte, G. Lee and J.W. Barlow 123

Strength of the DTM RapidSteel™ 1.0 material
T.D. Stewart, K.W. Dalgarno and T.H.C. Childs 133

Rapid freezing prototyping with water
W. Zhang, M.C. Leu, Z. Ji and Y. Yan 139

Gas-phase Selective Area Laser Deposition (SALD) joining of SiC
S. Harrison and H.L. Marcus 147

Number 4

Special Issue: Improving Materials Performance
Guest Editor: K.R. Trethewey

Editorial iii

Aerosol transport modeling as an aid to understanding atmospheric corrosivity patterns
R.D. Kiassen and P.R. Roberge 159

Neural network methods for corrosion data reduction
R.A. Cottis, L. Qing, G. Owen, S.J. Gartland, I.A. Helliwell and M. Turega 169

The sand erosion performance of coatings
R.J.K. Wood 179

The static strength of end and T fillet weld connections
B.G. Mellor, R.C.T. Rainey and N.E. Kirk 193

Number 5

Composite adhesive joints under cyclic loading
W.C. de Goeij, M.J.L. van Tooren and A. Beukers 213

Fabrication of iron disilicide ($FeSi_2$) thermoelectric generator by the tape casting method
L.A. Salam, R.D. Matthews and H. Robertson 223

Technological design of metal/ceramic composite tubes
W. Hua, L. Cheng and W. Lianbo 229

0261-3069/99/$-see front matter © 1999 Elsevier Science Ltd. All rights reserved.

Study on an Fe-TiC surface composite produced in situ
Y. Wang, X. Zhang, F. Li and G. Zeng 233

The six-component force sensor for measuring the loading of the feet in locomotion
L.-P. Chao and C.-Y. Yin 237

Materials and constructions used in devices to prevent the spread of flames in pipelines and vessels
K.L. Edwards and M.J. Norris 245

Effect of some design parameters on the suspension characteristics of a mechanically agitated sand-water slurry system
P.K. Biswas, S.C. Dev, K.M. Godiwalla and C.S. Sivaramakrishnan 253

The suitability of aluminium as an alternative material for car bodies
D. Carle and G. Blount 267

Number 6

Comparison of the developed thermal stresses in Al_2O_3–SG, ZrO_2–12%Si+Al and ZrO_2–SG coating systems subjected to thermal loading
U. Kocabıcak, A. Mimaroglu, O. Sarıkaya and O.H. Mete 287

Tight-binding molecular-dynamics study of a copper oxide Cu_4O
P. Liu and Y. Wang 291

The effect of surface GeO_2-doping and CeO_2-doping on the degradation of 2Y-TZP ceramic on annealing in water at 200°C
Z. Zhao, C. Liu and D.O. Northwood 297

Die erosion and its effect on soldering formation in high pressure die casting of aluminium alloys
Z.W. Chen and M.Z. Jahedi 303

Design of a novel insulated construction material
C.R. Gentle and M.R. Lacey 311

Material characteristics of an ER fluid and its influence on damping forces of an ER damper. Part I: material characteristics
W.C. Park, S.B. Choi and M.S. Suh 317

Material characteristics of an ER fluid and its influence on damping forces of an ER damper. Part II: damping forces
W.C. Park, S.B. Choi and M.S. Suh 325

Influence of notch severity on the impact fracture behavior of aluminum alloy 7055
J. Champlin, J. Zakrajsek, T.S. Srivatsan, P.C. Lam and M. Manoharan 331

Author Index

Aufdlemorte, T.B. 123

Baldwin, M.D. 107
Barlow, J.W. 123
Beaman, J.J. 115
Benson-Tolle, T. 91
Beukers, A. 213
Biswas, P.K. 253
Blount, G. 267
Bøhn, J.H. 77
Bourell, D.L. 115
Brooks, J. 107

Carle, D. 267
Champlin, J. 331
Chao, L.-P. 237
Chartoff, R.P. 91
Chen, Z.W. 303
Cheng, L. 229
Childs, T.H.C. 133
Choi, S.B. 317, 325
Cima, M.J. 63
Cooper, A.G. 83
Cottis, R.A. 169

Dalgarno, K.W. 133
Das, S. 115
de Goeij, W.C. 213
Dev, S.C. 253
Dickens, P. 99

Edwards, K.L. 245
Ensz, M.T. 107
Essien, M. 107

Feng, D. 19
Fox, W.C. 123

Gartland, S.J. 169
Gentle, C.R. 311
Godiwalla, K.M. 253
Griffith, M.L. 107

Hahn, G. 31
Harrison, S. 147
Harwell, L.D. 107
Helliwell, I.A. 169
Hofmeister, W.H. 107
Hopkinson, N. 99
Hua, W. 229

Jackson, T.R. 63
Jahedi, M.Z. 303
Ji, Z. 139

Kang, S. 83
Kietzman, J.W. 83
Kim, D.-K. 41
Kirk, N.E. 193
Klassen, R.D. 159
Kocabıcak, U. 287

Lacey, M.R. 311
Lam, P.C. 331
Lee, G. 123
Lee, S. 31, 41
Leu, M.C. 139
Li, F. 19, 233
Lianbo, W. 229
Liu, C. 297
Liu, H. 63
Liu, P. 291
Lombardi, J.L. 83

Manoharan, M. 331
Marcus, H.L. 147
Matthews, R.D. 223
Mellor, B.G. 193
Mete, O.H. 287
Mimaroglu, A. 287

Nelson, D.V. 107
Norris, M.J. 245
Northwood, D.O. 297

Oh, J.-E. 31
Oliver, M.S. 107
Owen, G. 169

Park, W.C. 317, 325
Patrikalakis, N.M. 63
Prinz, F.B. 83

Qing, L. 169

Rainey, R.C.T. 193
Raj, R. 1
Rhee, M. 31
Riddington, J.R. 13
Roberge, P.R. 159
Robertson, H. 223
Robino, C.V. 107

Sachs, E.M. 63
Sahota, M.K. 13
Salam, L.A. 223
Sarıkaya, O. 287
Schlienger, M.E. 107
Schultz, J.W. 91
Sivaramakrishnan, C.S. 253
Smugeresky, J.E. 107
Srivatsan, T.S. 331
Stewart, T.D. 133
Subbarayan, G. 1
Suh, M.S. 317, 325
Swain, L.D. 123

Thompson, B.S. 23

Turega, M. 169
Tyberg, J. 77

Ullett, J.S. 91

Vail, N.K. 123
van Tooren, M.J.L. 213

Wang, Y. 19, 233, 291
Weiss, L.E. 83
Wert, M.J. 107
Wohlert, M. 115
Wood, R.J.K. 179

Yan, Y. 139
Yin, C.-Y. 237

Zakrajsek, J. 331
Zeng, G. 19, 233
Zhang, W. 139
Zhang, X. 233
Zhao, Z. 297

Keyword Index

12%Si+Al
alumina; ZrO_2; thermal stresses 287
adhesive
composite; joint; fatigue 213
aerosol deposition
aerosol transport; corrosion severity 159
aerosol transport
corrosion severity; aerosol deposition 159
alumina
12%Si+Al; ZrO_2; thermal stresses 287
aluminium
cars; lightweight; car body 267
aluminum alloy
notch severity; fracture behavior 331
atomic structure
tight-binding; molecular dynamic simulation; density of states 291

bingham model
ER damper; damping force 325
biomedical
ceramic matrix; lasers; sintering; rapid prototyping 123

car body
aluminium; cars; lightweight 267
cars
aluminium; lightweight; car body 267
casting
mechanical; wear (erosion) 303
CeO_2
Y-TZP ceramic; surface-doping; GeO_2; hydrothermal corrosion 297
centrifugal technique
self-propagating high temperature synthesis (SHS); composite tube 229
ceramic matrix
lasers; sintering; rapid prototyping; biomedical 123
composite tube
self-propagating high temperature synthesis (SHS); centrifugal technique 229
coatings
sand; slurry; impact energy; erosion resistance 179
composite
joint; adhesive; fatigue 213
construction
polymers; sandwich structure 311
corrosion behaviour
neural network methods; stainless steel 169
corrosion severity
aerosol transport; aerosol deposition 159
coupon testing
thermosets; laminates; crystalline state; thermal analysis 91
creep and shrinkage
lead alloys; work hardening; infilled frames 13
cross-sectional shape
space frame; thickness/width (or diameter) ratio; impact absorption energy; maximum resistive force 41
crystalline state
thermosets; laminates; coupon testing; thermal analysis 91

damping force
ER damper; bingham model 325
density of states
tight-binding; molecular dynamic simulation; atomic structure 291
design for environment
selection of material properties; engineering design; design for recycling; whole-life design 23
design for recycling
selection of material properties; engineering design; design for environment; whole-life design 23
direct fabrication
selective laser sintering; hot isostatic pressing; titanium 115

ER damper
damping force; bingham model 325
electro-rheological fluid
yield shear stress; mechanical and electrical durability 317
engineering ceramics
joining; lasers 147
engineering ceramics
polymers; rapid prototyping 83
engineering design
selection of material properties; design for environment; design for recycling; whole-life design 23
erosion resistance
coatings; sand; slurry; impact energy 179
extrusion
forming; rapid solidification; solid freeform fabrication; rapid prototyping 139

failure analysis
ferrous metals and alloys; welding; fracture; finite element analysis 193
fatigue
composite; joint; adhesive 213
Fe–TiC surface composite
in situ generation; liquid reaction casting; gradient distribution; microstructure 233
Fe-VC surface composite
in situ generation; metal-coated casting; microstructure; wear-resistance 19
ferrous metals and alloys
lasers; microstructure 107
ferrous metals and alloys
sintering; mechanical; microstructure 133
ferrous metals and alloys
welding; fracture; failure analysis; finite element analysis 193
finite element analysis
ferrous metals and alloys; welding; fracture; failure analysis; 193
flame arresters
protective systems; safety devices; materials and constructions 245
force sensor
gait; potentiometer; toe; heel 237
forming
extrusion; rapid solidification; solid freeform fabrication; rapid prototyping 139

fracture behavior
notch severity; aluminum alloy 331
fracture
ferrous metals and alloys; welding; failure analysis; finite element analysis 193
functional modeling
solid modeling; rapid prototyping 63

gait
force sensor; potentiometer; toe; heel 237
GeO_2
Y-TZP ceramic; surface-doping; CeO_2; hydrothermal corrosion 297
gradient distribution
Fe–TiC surface composite; in situ generation; liquid reaction casting; microstructure 233

heel
force sensor; gait; potentiometer; toe 237
hot isostatic pressing
selective laser sintering; direct fabrication; titanium 115
hydrothermal corrosion
Y-TZP ceramic; surface-doping; GeO_2; CeO_2 297

impact absorption energy
space frame; cross-sectional shape; thickness/width (or diameter) ratio; maximum resistive force 41
impact absorption energy
space frame; triggering dent 31
impact energy
coatings; sand; slurry; erosion resistance 179
in situ generation
Fe–TiC surface composite; liquid reaction casting; gradient distribution; microstructure 233
in situ generation
Fe-VC surface composite; metal-coated casting; microstructure; wear-resistance 19
infilled frames
lead alloys; work hardening; creep and shrinkage 13

joining
lasers; engineering ceramics 147
joint
composite; adhesive; fatigue 213

laminates
thermosets; crystalline state; coupon testing; thermal analysis 91
lasers
ceramic matrix; sintering; rapid prototyping; biomedical 123
lasers
ferrous metals and alloys; microstructure 107
lasers
joining; engineering ceramics 147
lead alloys
work hardening; infilled frames; creep and shrinkage 13
lightweight
aluminium; cars; car body 267
liquid reaction casting
Fe–TiC surface composite; in situ generation; gradient distribution; microstructure 233

materials and constructions
protective systems; flame arresters; safety devices 245
maximum resistive force
space frame; cross-sectional shape; thickness/width (or diameter) ratio; impact absorption energy 41
mechanical
casting; wear (erosion) 303
mechanical
ferrous metals and alloys; sintering; microstructure 133
mechanical agitation
modeling; particle dispersion; sand–water slurry 253
mechanical alloying
tape casting; thermoelectric materials; multi-materials; powder; sintering 223
mechanical and electrical durability
electro-rheological fluid; yield shear stress 317
metal-coated casting
Fe-VC surface composite; in situ generation; microstructure; wear-resistance 19
micro/nanostructure of materials
shape and architecture; thermal, mechanical and chemical loading 1
microstructure
Fe–TiC surface composite; in situ generation; liquid reaction casting; gradient distribution 233
microstructure
Fe-VC surface composite; in situ generation; metal-coated casting; wear-resistance 19
microstructure
ferrous metals and alloys; lasers 107
microstructure
ferrous metals and alloys; sintering; mechanical 133
modeling
particle dispersion; sand–water slurry; mechanical agitation 253
molecular dynamic simulation
tight-binding; atomic structure; density of states 291
moulding
polymers; rapid prototyping 99
multi-materials
tape casting; thermoelectric materials; mechanical alloying; powder; sintering 223

neural network methods
corrosion behaviour; stainless steel 169
notch severity
fracture behavior; aluminum alloy 331

particle dispersion
modeling; sand–water slurry; mechanical agitation 253
plastic behavior
thermoplastics; shrinkage; rapid prototyping 77
polymers
engineering ceramics; rapid prototyping 83
polymers
moulding; rapid prototyping 99
polymers
sandwich structures; construction 311
potentiometer
force sensor; gait; toe; heel 237
powder
tape casting; thermoelectric materi-

als; mechanical alloying; multi-materials; sintering 223
protective systems
flame arresters; safety devices; materials and constructions 245

rapid prototyping
functional modeling; solid modeling 63
thermoplastics; shrinkage; plastic behavior 77
ceramic matrix; lasers; sintering; engineering ceramics; polymers 83
polymers; moulding 99
forming; extrusion; rapid solidification; solid freeform fabrication 139

safety devices
protective systems; flame arresters; materials and constructions 245
sand–water slurry
modeling; particle dispersion; mechanical agitation 253
sand
coatings; slurry; impact energy; erosion resistance 179
sandwich structures
polymers; construction 311
selection of material properties
engineering design; design for environment; design for recycling; whole-life design 23
selective laser sintering
hot isostatic pressing; direct fabrication; titanium 115
self-propagating high temperature synthesis (SHS)
centrifugal technique; composite tube 229
shape and architecture
micro/nanostructure of materials; thermal, mechanical and chemical loading 1
shrinkage
thermoplastics; plastic behavior; rapid prototyping 77
sintering
ceramic matrix; lasers; rapid prototyping; biomedical 123
sintering
ferrous metals and alloys; mechanical; microstructure 133
tape casting; thermoelectric materials; mechanical alloying; multi-materials; powder 223
slurry
coatings; sand; impact energy; erosion resistance 179
solid freeform fabrication
forming; extrusion; rapid solidification; rapid prototyping 139
solid modeling
functional modeling; rapid prototyping 63
space frame
cross-sectional shape; thickness/width (or diameter) ratio; impact absorption energy; maximum resistive force 41
triggering dent; impact absorption energy 31
stainless steel
neural network methods; corrosion behaviour 169
surface-doping
Y-TZP ceramic; GeO_2; CeO_2; hydrothermal 297

tape casting
thermoelectric materials; mechanical alloying; multi-materials; powder; sintering 223
thermal analysis
thermosets; laminates; crystalline state; coupon testing 91
thermal stresses
alumina; 12%Si+Al; ZrO_2 287
thermal, mechanical and chemical loading
micro/nanostructure of materials; shape and architecture 1
thermoelectric materials
tape casting; mechanical alloying; multi-materials; powder; sintering 223
thermoplastics
shrinkage; plastic behavior; rapid prototyping 77
thermosets
space frame; cross-sectional shape; impact absorption energy; maximum resistive force 41
laminates; crystalline state; coupon testing; thermal analysis 91
tight-binding
molecular dynamic simulation; atomic structure; density of states 291
titanium
selective laser sintering; hot isostatic pressing; direct fabrication 115
toe
force sensor; gait; potentiometer; heel 237
triggering dent
space frame; impact absorption energy 31

wear (erosion)
casting; mechanical 303
wear-resistance
Fe-VC surface composite; in situ generation; metal-coated casting; microstructure 19
welding
ferrous metals and alloys; fracture; failure analysis; finite element analysis 193
whole-life design
selection of material properties; engineering design; design for environment; design for recycling 23
work hardening
lead alloys; infilled frames; creep and shrinkage 13

Y-TZP ceramic
surface-doping; GeO_2; CeO_2; hydrothermal corrosion 297
yield shear stress
electro-rheological fluid; mechanical and electrical durability 317

ZrO_2
alumina; 12%Si+Al; thermal stresses 287